MASONRY: CONCRETE MASONRY UNIT STANDARDS DSA Circular 21-1

Discipline: Structural
Reference: California Building Code, Sections 2102A.5, U.B.C. Std. 21-4 Issued 08-18-04

This circular is intended for use by the DSA plan review engineers and field engineers to indicate an acceptable method for achieving compliance with applicable codes. Its purpose is to promote uniform statewide criteria for use in plan and construction review of projects within the jurisdiction of DSA. Other methods proposed by design professionals to solve a particular problem may be considered by DSA and reviewed for code compliance.

1.0 PURPOSE: This circular indicates Division of the State Architect's (DSA) acceptance of current standards applicable to concrete masonry unit materials, sampling and testing for projects under DSA jurisdiction, which includes public schools (K-12 and Community Colleges) and state essential services facilities. These current standards, published by the American Society for Testing and Materials (ASTM), include the following:

- ASTM C 90-02a, *Standard Specification for Load-Bearing Concrete Masonry Units*
- ASTM C 140-02a, *Standard Test Methods for Sampling and Testing Concrete Masonry Units*
- ASTM C 426-99, *Standard Test Method for Linear Drying Shrinkage of Concrete Masonry Units*

2.0 BACKGROUND: Section 2102A.5.2 of the 2001 CBC, which was based on ASTM C 90-95, mandates the use of Grade N-1 concrete masonry units (Type I moisture-controlled units) for projects under DSA jurisdiction.

ASTM C 90 was revised in year 2000 to remove the Type I and Type II classifications. This change has been continued in subsequent revisions of ASTM C 90, including the current edition, ASTM C 90-02a.

3.0 SUMMARY: When these current standards are applied on a project under DSA jurisdiction, the design, sampling and testing of masonry units must comply with the following requirements.

3.1 Design and Specifications

- Plans and specifications shall reference the current standards, listed above, and the project design shall conform to these standards and this DSA Circular.
- Type I moisture-controlled units shall not be specified since they are no longer recognized in the current edition, ASTM C 90-02a.
- Control joints should be specified at a maximum of 25 feet spacing, in accordance with the National Concrete Masonry Association (NCMA) TEK 10-1A, "Crack Control in Concrete Masonry Walls." Alternatively, refer to section 3.2.2, below.

3.2 Sampling and Testing Of Concrete Masonry Units

The owner's material testing laboratory must be currently accepted by DSA's Laboratory Acceptance Program (LEA). The owner's laboratory shall sample masonry units in accordance with ASTM C 90 Section 4 and perform the following tests:

3.2.1 Mandatory Tests

- Measurements (Section 5, ASTM C 140)
- Compressive strength (Section 6, ASTM C 140)
- Absorption (Section 8, ASTM C 140)

3.2.2 Shrinkage Testing of Concrete Masonry Units

Per ASTM C 90, Sections 5.2 and 8.3, manufacturers are required to conduct regular quality control testing to ensure that units delivered to projects will meet the linear shrinkage requirement (0.065 percent maximum).

DSA will not require project-specific linear shrinkage testing if control joints are specified at 25 feet maximum spacing, otherwise testing is required. Additionally, the project design professional may require linear shrinkage testing for special design or construction conditions.

When testing is required, the owner's material testing laboratory shall conduct linear shrinkage testing in accordance with ASTM C 426. Test data shall be traceable to the units being supplied for the project, and shall comply with ASTM C 90, Section 8.3.

3.2.3 Reporting

Test reports conforming to Section 10 of ASTM C 140 and Section 4-335 (d) of Title 24, Part 1 shall be submitted to the project design professionals, the project inspector, the owner, and DSA.